

Abstract Submitted
for the 4CS21 Meeting of
The American Physical Society

A Patch Model of Electron Yield for Complex Materials¹

MATTHEW ROBERTSON, TRACE TAYLOR, TOM KEATON, JR DENNISON, Utah State University — Electron yield (EY) is a material attribute which describe the ratio of emitted electrons to incident electrons when irradiated with an electron beam. EY is beam energy dependent, unique to each material determined by its chemical composition, electronic configuration and modified by several extrinsic factors such as surface roughness and contamination. Most yield models describe the yield of a single material with no consideration of extrinsic modifications. These models are also not suited to handle more complex samples made of more than one material. This research proposes a simple patch model to characterize complex materials and extrinsic factors in yield analysis. The patch model considers the electron yield contribution of each material or feature independently. The yield for a complex material is then the sum of the yield contributions of each of the individual material patches. Using a unit cell view of the surface creates a simpler patch model where the yield is the weighted sum of the individual components. This model works with any number of different materials and can be extended to a second layer using current two-layer yield models. Separating the yield contributions of individual components allows for greater characterization of complex materials.

¹Supported by a Utah NASA Space Grant Graduate Fellowship.

Matthew Robertson
Utah State University

Date submitted: 10 Sep 2021

Electronic form version 1.4